

REMARKS

Applicant respectfully requests reconsideration and allowance of the subject application in view of the amendments and the remarks to follow. Claims 26-27, 30-35, 37-38, 41-44, 47-49, 51-52, 55-57, 60-65, 67-68, and 71
 5 are pending in the application. Claims 26, 35, 38, 43, 49, 52, 65, and 68 have been amended. Claims 28, 29, 36, 39, 40, 45, 46, 50, 53, 54, 58, 59, 66, 69, and 70 have been cancelled.

35 U.S.C. § 102

10 Claims 26, 28, 30-36, 38-39, 41, 43, 45, 47-50, 52, 53, 55-56, 58, 60-66, 68-69 and 71 stand rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,601,941 B1 to Jones et al. (hereinafter "Jones"). Applicant respectfully traverses the rejection. However, to further expedite prosecution, the Applicant has amended the claims to includes features from Claim 42 and
 15 therefore will address that rejection with respect to these claims in the following remarks.

35 U.S.C. § 103

Claims 27, 29, 37, 40, 42, 44, 46, 51, 54, 57, 59, 67 and 70 stand rejected
 20 under 35 U.S.C. §103(a) as being unpatentable over Jones in view of Kojima, U.S. Patent No. 5,999,204 (hereinafter "Kojima"). Applicant respectfully disagrees and requests reconsideration.

Jones is directed to a method and apparatus for predicting and limiting maximum printhead chip temperature in an ink jet printer. Jones describes:

25 A method of controlling a temperature of a print chip of a printhead in an ink jet printer includes providing a memory device within the printer. Ink is emitted from the

5 printhead. Temperature data associated with the print chip during the emitting step is recorded. A thermal resistance value associated with the printhead and/or a thermal capacitance value associated with the printhead is calculated. The calculating is dependent upon the recorded temperature data. The thermal resistance value associated with the printhead and/or the thermal capacitance value associated with the printhead is stored in the memory device. A temperature of the print chip at a future point in time is estimated based upon a number of ink drops to be emitted by the printhead before the future point in time, and the thermal resistance value associated with the printhead and/or the thermal capacitance value associated with the printhead. The thermal resistance and/or the thermal capacitance values vary with the print power, target temperature, and heatsink temperatures. The estimated temperature is compared to a predetermined limit temperature. If the estimated temperature exceeds the predetermined limit temperature, the number of ink drops to be emitted by the printhead before the future point in time is reduced. *Jones, Abstract.*

However, Jones does not describe determining an initial temperature for each printhead in printing each cell in a swath, and using the initial temperature to calculate an estimated peak temperature for each printhead in printing each cell of the swath. Nor does Jones describe calculating estimated peak temperature for each cell by adding the quotient of ink drop estimate over a constant to an initial temperature for each cell.

Kojima describes a thermal image recording method. Kojima refers to an image or screen divided into regions defined by positions (i,j) representing horizontal and vertical directions respectively. *Kojima, col.5, lines 39-45; col.5 lines 51-56, col.6, lines 1-7.* This response will refer to these horizontal and vertical directions where appropriate for clarity. In particular, vertical refers to the direction of travel of the thermal medium and the corresponding vertical positions or lines as described by Kojima. Horizontal refers to the direction

perpendicular to the medium (e.g. the thermal head extends in the horizontal direction across the medium).

Thermal imaging as in Kojima does not involve pass or multi-pass printing. (e.g. printing in horizontal swaths). The thermal head does not travel
 5 across the thermal medium. Rather, heat generating resistors corresponding to each pixel in a line are arranged in one direction (horizontal) on a thermal head. Thermal head extends across the thermal medium in the horizontal direction. A recording medium moves relative to the thermal head in a direction perpendicular to the resistors, the vertical direction. The image is recorded one
 10 line (horizontal) at a time as the medium moves vertically. *Kojima, Fig. 2; col. 5, lines 44-53.* Kojima involves temperature compensation of image data to be recorded. Kojima describes the operation of a thermal imaging apparatus, the problems associated with thermal recording, and the temperature compensation of image data in the following excerpts:

15 As is well known, the thermal image recording apparatus uses a thermal head having a glaze in which heat generating resistors corresponding to the number of pixels of one line are arranged in one direction and, with the
 20 glaze slightly pressed against the thermal recording layer of the thermal material, the two members are moved relative to each other in a direction approximately perpendicular to the direction in which the heat generating resistors are arranged, and the respective heat generating
 25 resistors of the glaze are heated in accordance with the image to be recorded to heat the thermal recording layer imagewise, thereby accomplishing image reproduction. *Kojima, col. 1, lines 26-37.*

30 However, the temperatures of the heat generating resistors to be energized vary from each other depending on the history of heat generation up to the previous line and, therefore, even if the heat generating resistors
 35 corresponding to the pixels having the same image data in the present line are energized for the same time period, temperature differences will occur between the heated resistors, thereby producing unevenness in the recording density *Kojima, col. 1, lines 43-50.*

5 In order to solve this problem of uneven recording densities, the image data must be compensated for temperature such that the heat generating temperature for the image data are corrected for each heat generating resistor on the basis of that image data and the history of heat generation up to the previous line. *Kojima, col. 1, lines 51-56.*

10 the image processing unit 80 calculates the value of temperature correction $K_{sub.m}$ for each of the pixels in the image to be recorded on one screen, calculates the image data as temperature corrected by $K_{sub.m}$, and writes the corrected data into the image memory 82. Thereafter, the recording control unit 84 uses the temperature corrected image data to control the heat generation by the individual heat generating resistors in the glaze 66a on the thermal head 66. This is the way an image is recorded on one screen by means of the thermal head 66. *Kojima col.10, lines 52-61.*

20 Thus as the above excerpts show, Kojima is drawn to a method of correcting image data for the history of heat generating up to the previous line (e.g. data from a previous vertical position). For a particular resistor, corresponding to a particular pixel in the present line, Kojima determines compensation based upon predicted temperatures for components of the thermal head from previous lines and not from predicted temperatures within the same line. Kojima modifies original image data pixel by pixel to compensate for predicted temperature history of the image, stores the modified image data in memory, and records the image using the modified data.

30 The Office has failed to establish a prima facie case of obviousness. To establish a prima facie case of obviousness, three basic criteria must be met:

35 First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. *MPEP § 2143.*

Here, Jones and Kojima, alone or in combination, fail to teach or suggest all the claim limitations of the Applicant's claims. In addition, the Office has not provided a sufficient motivation to make the proposed combination of Jones and Kojima. Accordingly, a prima facie case of obviousness has not been
 5 established and the §103 rejections must be withdrawn.

Claim 42, as previously presented, recites a process for managing temperature in a printer which includes:

- preprocessing a file into a plurality of swaths;
- 10 • preprocessing a selected swath of the plurality of swaths into a plurality of cells;
- calculating an estimated peak temperature for a printhead in printing at least one cell of the plurality of cells, the calculating step comprising:
- 15 • estimating a number of ink drops required to print the at least one cell of the selected swath;
- determining a quotient of the ink drop estimate over a constant;
- adding the quotient to an initial temperature of the printhead; and
- 20 • printing the selected swath in response to the estimated peak temperature for the printhead in printing, the at least one cell being below a predetermined maximum temperature.

The proposed combination of Jones and Kojima fails to teach or suggest all the recited features of Claim 42. The Office correctly asserts that Jones fails to disclose "measuring the temperature of each printhead prior to printing said
 25 swath and employing said measured temperature as an initial temperature in calculating said estimated peak temperature for each printhead in printing a first cell of the swath, wherein the temperature of each printhead prior to and after each cell in the swath is measured by a temperature sensor...and wherein calculating the estimated peak temperature from a sum of a product or quotient
 30 of the estimated ink drop or density and a constant and an initial temperature of each printhead prior to printing each cell". *Office Action dated February 18, 2005 p. 5.* Accordingly, Jones fails to disclose the recited features of claim 42

for example “determining a quotient of the ink drop estimate over a constant”, “adding the quotient to an initial temperature of the printhead” or “initial temperature of the printhead” in cells of a swath.

To correct the defect in Jones, the Office asserts Kojima, noting that it
 5 would have been obvious “to modify the method for controlling the temperature in the printer disclosed by Jones et al such as measuring the temperature of each printhead prior to printing a swath and employing the measured temperature as an initial temperature in calculating an estimated peak temperature for each printhead in printing the first cell of the swath as disclosed by Kojima.” *Office*
 10 *Action dated February 18, 2005 p. 6.* Respectfully, the proposed modification is in error. The proposed modification attributes to Kojima features which Kojima does not disclose, teach, or suggest. Additionally, Kojima fails to correct the defects in Jones.

Jones and Kojima alone or in combination fail to teach or suggest
 15 “calculating an estimated peak temperature for a printhead...the calculating step comprising ... an initial temperature of the printhead” as recited in claim 42. Kojima is geared to a thermal printer and does not disclose, teach or suggest measuring or employing “the initial temperature of the printhead” as recited in claim 42. Kojima does not use printheads. Kojima only describes a
 20 thermal head. A thermal head uses a line of resistors to record upon a thermal medium one line at a time. Thus, each resistor is fixed in the same horizontal position of the image record. The thermal system in Kojima uses the same heat generating resistor to record the same horizontal position of the image in each line. In contrast, a printhead of an ink jet printer, sweeps across the medium in
 25 a print swath. The thermal head as described in Kojima is not equivalent to a printhead or plurality of printheads. Further, Kojima does not even describe calculation of the temperature of the thermal head. Rather, Kojima measures

values of temperature for V_g of the glaze, V_b at the base, and V_h at the heat sink at the horizontal positions on the thermal head corresponding to region divisions. *Kojima, col.9 lines 3-5; col. 9, line 51-col.10, line 4.* This is not equivalent to the initial temperature of a printhead or of each printhead in a plurality. Accordingly, Kojima fails to disclose "initial temperature of the printhead" as recited in claim 42.

Additionally, Jones and Kojima alone or in combination fail to teach or suggest "preprocessing a selected swath of the plurality of swaths into a plurality of cells . . . calculating an estimated peak temperature for a printhead in printing at least one cell of the plurality of cells, the calculating step comprising... adding the quotient to an initial temperature of the printhead" as recited in claim 42. The thermal image recorder described in Kojima does not operate by printing swaths. A thermal printer as described in Kojima records one line (horizontal) at a time as the medium is moved (vertical) relative to the thermal head. Pixels across the horizontal direction of the image (a line) are recorded simultaneously. Kojima accordingly does not disclose measuring or determining temperatures for the cells in a swath. Kojima divides an entire image into a grid of regions. Initial temperatures are determined for different horizontal points corresponding to the region divisions. Kojima only describes setting initial temperatures for the regions once prior to recording an image. Initial values of temperature detected by thermistors are set as the initial values for V_b , V_g , and V_h . *Kojima, col. 9, lines 11-13.* Initial temperature values for V_b , V_g , and V_h set once prior to recording an entire image, are not equivalent to the initial temperatures for a printhead in printing each of a plurality of cells in a swath. Kojima in fact does not mention cells or swaths at all. The entire image is not equivalent to a swath, rather an image will have multiple swaths.

The Office cites *Kojima*, Fig 4. which shows a flow chart indicating detecting an initial value of temperature, and calculating an predicted value of temperature for each region. *Office Action dated, February 18, 2005, p. 6.* As previously described, the initial temperatures in *Kojima* are the values measured for Vg, Vb, and Vh, and are only measured once before recording an entire image. Fig. 4 does not show measuring or calculating the initial temperature of a printhead in a swath or in individual cells of the swath. Accordingly, Jones and *Kojima*, alone or in combination, fail to teach or suggest initial temperature for cells in a swath added to a quotient of ink drop over a constant as in claim 42.

Further, Jones and *Kojima*, alone or in combination, fail to teach or suggest "calculating an estimated peak temperature...the calculating step comprising...estimating a number of ink drops required to print the at least one cell of the selected swath; determining a quotient of the ink drop estimate over a constant; adding the quotient to an initial temperature of the printhead" as recited in claim 42. Jones, as the Office correctly recognizes, does not disclose the above recited features of claim 42.

The Office cites *Kojima* for representative value of image data and proportionality constant. *Office Action dated February 18, 2005 p.6.* The image data used in *Kojima* is not equivalent to an ink drop estimate for a cell. *Kojima* does not describe an ink drop estimate at all. *Kojima* merely discloses calculation of a thermal correction of image data based upon the image data. Specifically, the prediction of temperature values in *Kojima* involves a calculation in which the temperature prediction for a region is calculated from image data for the region and the regions of a previous line. *See Kojima, col. 9, line 50 – col. 10, line 4.* The representative value $M(i,j)$ is used to represent the

quantity of heat generated by an individual heat generating resistor. *Kojima, col. 10, lines 5-13.* Kojima describes the representative value as follows:

5 The representative value for the image data within each region may be the image data corresponding to a specified pixel in that region, or the average of the image data corresponding to a specified number of pixels in that region, or the average of the image data corresponding to all pixels in that region. *Kojima, col. 6, lines 45-50.*

For each region, the predicted temperature $V(i,j+1)$ is determined from the
 10 values for the previous lines, or regions, and in particular $V(i,j)$, $V(i+1,j)$ and $V(i-1, j)$. For each of the predicted temperature calculations described in Kojima, values for a given line $j+1$ are calculated from values from the previous line j . This is consistent with the problem to be addressed in thermal recording as described in Kojima, namely that the temperature and thus
 15 recording quality at particular horizontal point in a line, is dependent upon previous image/temperature data up to that line. The Kojima calculation uses at least three regions from a previous line, $V(i,j)$, $V(i+1,j)$ and $V(i-1, j)$. Each of these regions has an associated value for $M(i,j)$ include in the calculation. Thus, Kojima describes for example $V(i, j+1)$ is to be calculated from the image data
 20 $M(i,j)$, $M(i+1,j)$ and $M(i-1,j)$ of the previous line. Kojima incorporates image data for previous regions in the calculation. Using image data as representative values of the quantity of heat generated by an individual heat generating resistor from several regions in calculating a predicted temperature for a region is not "calculating an estimated peak temperature...the calculating step
 25 comprising...estimating a number of ink drops required to print the at least one cell of the selected swath; determining a quotient of the ink drop estimate over a constant; adding the quotient to an initial temperature of the printhead" as recited in claim 42. Accordingly Kojima fails to disclose, teach, or suggest the recited features of claim 42.

As the Examiner is well aware, a §103 obviousness rejection requires that all claim limitations must be taught or suggested by the prior art, as is elucidated in the following excerpt from the MPEP:

5 To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). *MPEP* § 2143.02

15 Kojima does not correct the previously noted defects in Jones. Jones and Kojima, alone or in combination, fail to teach or suggest all the recited features of claim 42. Therefore, a *prima facie* case of obviousness has not been established with respect to claim 42.

20 Additionally, the Office has not provided a sufficient motivation to combine. The suggested motivation to combine is faulty. The Office asserts the motivation "is to perform temperature compensation on image data of pixels in order to produce records without uneven image densities and to form recorded image of high quality at high speed." *Office Action dated February 18, 2005, p. 6*. The Applicant respectfully disagrees. The Office has conflated problems associated with thermal recording devices with those of ink jet printers. Temperature compensation on image data of pixels as described for the thermal recording device in Kojima is not desirable in ink jet printing systems.

The desirability of temperature compensation on image data of pixels in Kojima results from the method of image production described therein. Specifically, the image is recorded through heat generation. Image data is

translated into a current level to be applied to each heat generating resistor in each pixel of the image. Images are produced by applying heat directly to a thermal medium responsive to heat. Thus, excess heat generation from past lines could cause uneven recording densities. Kojima explains "even if the heat generating resistors corresponding to the pixels having the same image data in the present line are energized for the same time period, temperature differences will occur between the heated resistors, thereby producing unevenness in the recording density" *Kojima, col. 1, lines 43-50*. Temperature compensation as described in Kojima amounts to changing the current to be applied to resistor to produce particular image data at a particular pixel. Temperature compensation of image data is a viable option because heat is the method of producing the image. Thus temperature compensation, (changing current to be applied to resistors by modifying the data) allows the desired temperature for each resistor to be maintained and produces the desired image.

15 The corrected or modified image data is used to produce the desired image.

By contrast, in an ink jet system, an image is printed by drops of ink. If a certain number of drops are required to produce an image, then to obtain the desired image that number of drops must be applied. To maintain temperature below a target level in an ink jet system, the number of drops of ink would need to be reduced. It is not possible simply to produce the same image by reducing the number of drops by changing the image data. This is unlike the Kojima system in which thermal medium is responsive to heat such that the excess heat from image history may be corrected for by changing the level of energy applied to each pixel. Compensation as applied to Applicant's system in which heat is generated according to the number of drops, would involve changing the number of drops. However, if the number of drops was changed the desired image would not be produced. Thus, temperature compensation as described in

Kojima is not desirable in an ink jet system. Using temperature compensation on image data of pixels as described in Kojima in the Applicant's system simply would not result in producing the same image.

The Office asserts a desire to perform temperature correction of image data as the motivation to combine Jones and Kojima to create applicant's invention which does not involve temperature compensation of image data. A combination of Jones and Kojima in order to fulfill the cited motivation would necessarily require temperature correction of image data. Accordingly, combination in this manner would not produce the applicant's invention. The Office has failed to assert a sufficient motivation to combine, and the §103 rejection should be withdrawn. For at least the foregoing reasons, claim 42 is allowable, and the §103 rejection should be withdrawn.

Claim 26 has been amended and as amended (amended portion in bold italics) recites in part:

- calculating an estimated peak temperature for each printhead in printing each of the plurality of cells, *the calculating including:*
- *estimating a number of ink drops required for a printhead in printing a cell;*
- *determining a quotient of the ink drop estimate over a constant; and*
- *adding the quotient to an initial temperature for the printhead in the cell*

Claim 26 was amended to include features previously recited in claims 28 and 29 which have been cancelled. For one or more of the reasons discussed with regard to claim 42, the combination of Jones and Kojima does not teach or suggest the recited features of claim 26, such as "determining a quotient of the

ink drop estimate over a constant”, “adding the quotient to an initial temperature for the printhead” or “an initial temperature for the printhead in the cell.” Accordingly, claim 26 as amended is allowable over Jones and Kojima, alone or in combination.

5

Claim 35 has been amended and as amended (amended portion in bold italics) recites in part:

- *wherein calculating estimated peak temperature includes:*
- *estimating a number of ink drops required for a printhead in printing a cell;*
- *determining a quotient of the ink drop estimate over a constant;*
- *adding the quotient to an initial temperature for the printhead in the cell.*

For one or more of the reasons discussed with regard to claim 42, the combination of Jones and Kojima does not teach or suggest the recited feature of claim 35 such as “determining a quotient of the ink drop estimate over a constant”, “adding the quotient to an initial temperature for the printhead” or “an initial temperature for the printhead in the cell.” Accordingly, claim 35 as amended is allowable over Jones and Kojima alone or in combination.

20

Claim 38 has been amended and as amended (amended portion in bold italics) recites in part:

- calculating an estimated peak temperature of at least one printhead in printing each cell, *the calculating including:*
- *estimating a number of ink drops required for a printhead in printing a cell;*
- *determining a quotient of the ink drop estimate over a constant;*

25

- *adding the quotient to an initial temperature for the printhead in the cell*

Claim 38 was amended to include features previously recited in claims 39 and 40 which have been cancelled. For one or more of the reasons discussed with regard to claim 42, Jones and Kojima alone or in combination do not teach or suggest the recited features of claim 26, such as “determining a quotient of the ink drop estimate over a constant”, “adding the quotient to an initial temperature for the printhead” or “an initial temperature for the printhead in the cell.” Accordingly, claim 38 as amended is allowable over Jones and Kojima, alone or in combination.

Claim 43 has been amended and as amended (amended portion in bold italics) recites in part:

- calculating an estimated peak temperature for a printhead in printing at least one cell of the plurality of cells, *the calculating including:*
- *estimating a number of ink drops required for the printhead to print the at least one cell of the selected swath;*
- *determining a quotient of the ink drop estimate over a constant;*
- *adding the quotient to an initial temperature of the printhead in the at least one cell*

Claim 43 was amended to include features previously recited in claims 45 and 46 which have been cancelled. For one or more of the reasons discussed with regard to claim 42, Jones and Kojima, alone or in combination, do not teach or suggest the recited features of claim 43, such as “determining a quotient of the ink drop estimate over a constant”, “adding the quotient to an

initial temperature of the printhead” or “an initial temperature of the printhead in the at least one cell.” Accordingly, claim 43 as amended is allowable over Jones and Kojima, alone or in combination.

5 Claim 49 has been amended and as amended (amended portion in bold italics) recites in part:

- calculating an estimated peak temperature of at least one printhead in printing the at least one cell of a selected swath,
 the calculating estimated peak temperature including:
- 10 • *estimating a number of ink drops required for the at least one printhead in printing a cell;*
- *determining a quotient of the ink drop estimate over a constant;*
- *adding the quotient to an initial temperature for the at least*
 one printhead in the cell
- 15

For one or more of the reasons discussed with regard to claim 42, Jones and Kojima, alone or in combination, do not teach or suggest the recited features of claim 49, such as “determining a quotient of the ink drop estimate over a constant”, “adding the quotient to an initial temperature for the at least
 20 one printhead” or “an initial temperature for the at least one printhead in the cell.” Accordingly, claim 49 as amended is allowable over Jones and Kojima, alone or in combination.

25 Claim 52 has been amended and as amended (amended portion in bold italics) recites in part:

- calculating an estimated peak temperature of at least one printhead in printing the at least one cell of a selected swath, *the calculating estimated peak temperature including:*
- *estimating a number of ink drops required for the at least one printhead in printing a cell;*
- *determining a quotient of the ink drop estimate over a constant;*
- *adding the quotient to an initial temperature for the at least one printhead in the cell*

Claim 52 was amended to include features previously recited in claims 53 and 54 which have been cancelled. For one or more of the reasons discussed with regard to claim 42, Jones and Kojima, alone or in combination, do not teach or suggest the recited features of claim 52, such as “determining a quotient of the ink drop estimate over a constant”, “adding the quotient to an initial temperature for the printhead” or “an initial temperature for the at least one printhead in the cell.” Accordingly, claim 52 as amended is allowable over Jones and Kojima, alone or in combination.

Claim 56 has been amended and as amended (amended portion in bold italics) recites in part:

- calculating an estimated peak temperature for each printhead of a plurality of printheads in printing each of the plurality of cells, *the calculating including:*
- *estimating a number of ink drops required for a printhead to print a cell;*
- *determining a quotient of the ink drop estimate over a constant;*
- *adding the quotient to an initial temperature for the printhead in the cell*

Claim 56 was amended to include features previously recited in claims 58 and 59 which have been cancelled. For one or more of the reasons discussed with regard to claim 42, Jones and Kojima, alone or in combination, do not teach or suggest the recited features of claim 56, such as “determining a
5 quotient of the ink drop estimate over a constant”, “adding the quotient to an initial temperature for the printhead” or “an initial temperature for the printhead in the cell.” Accordingly, claim 56 as amended is allowable over Jones and Kojima, alone or in combination.

10 Claim 65 has been amended and as amended (amended portion in bold italics) recites in part:

- *wherein calculating estimated peak temperature includes:*
- *estimating a number of ink drops required for the at least one printhead in printing a cell;*
- 15 • *determining a quotient of the ink drop estimate over a constant;*
- *adding the quotient to an initial temperature for the at least one printhead in the cell*

For one or more of the reasons discussed with regard to claim 42, the Combination of Jones and Kojima does not teach or suggest the recited feature
20 of claim 65 such as “determining a quotient of the ink drop estimate over a constant”, “adding the quotient to an initial temperature for the at least one printhead” or “an initial temperature for the at least one printhead in the cell.” Accordingly, claim 65 as amended is allowable over Jones and Kojima alone or in combination.

25

Claim 68 has been amended and as amended (amended portion in bold italics) recites in part:

- calculating an estimated peak temperature of at least one printhead of a plurality of printheads in printing each cell, *the calculating including:*
- *estimating a number of ink drops required for the at least one printhead to print a cell;*
- *determining a quotient of the ink drop estimate over a constant;*
- *adding the quotient to an initial temperature for the at least one printhead in the cell*

10 Claim 68 was amended to include features previously recited in claims 69 and 70 which have been cancelled. For one or more of the reasons discussed with regard to claim 42, Jones and Kojima, alone or in combination, do not teach or suggest the recited features of claim 68, such as “determining a quotient of the ink drop estimate over a constant”, “adding the quotient to an
15 initial temperature for the at least one printhead” or “an initial temperature for the at least one printhead in the cell.” Accordingly, claim 68 as amended is allowable over Jones and Kojima, alone or in combination.

20 Claims 29, 40, 46, 54, 59, and 70 have been cancelled. The features previously recited in these claims were incorporated into independent claims which are allowable as previously discussed.

Claims 27, 37, 44, 51, 57, and 67 are allowable for their respective dependencies on allowable base claims. Additionally, some or all of claims 27,
25 37, 44, 51, 57 and 67 are allowable for their own recited features which are not taught or suggested by Jones and Kojima, alone or in combination. For example:

Claim 27 recites:

- measuring the temperature of each printhead prior to printing the swath; and
- employing the measured temperature as an initial temperature in calculating the estimated peak temperature for each printhead in printing a first cell of the swath.

Jones does not show the recited features of claim 27 as noted by the examiner. *Office Action dated February 18, 2005 p. 5.* Further, Kojima does not disclose measuring the temperature of a printhead prior to printing a swath. As discussed regarding claim 42, Kojima does not involve printheads or swaths. In addition, Kojima measures initial values for Vb, Vh, Vg, only once before recording an entire file. Therefore, Kojima does not disclose measuring the temperature of each printhead prior to printing the swath as recited in claim 27. Kojima does not correct the defect in Jones. Accordingly, Jones and Kojima, alone or in combination, fail to teach or suggest the recited features of claim 27.

Claim 37 recites:

- wherein the ATPSS module is further configured to measure the temperature of each printhead prior to and after printing each cell in the swath with the temperature sensor.
- Jones does not show the recited features of claim 37 as noted by the examiner. *Office Action dated February 18, 2005 p. 5.* Further, Kojima does not disclose measuring the temperature of each printhead prior to and after printing each cell in a swath. As discussed regarding claim 42, Kojima does not involve printheads or swaths. Therefore, Kojima does not disclose measuring temperature of printheads in cells of a swath. Kojima only discloses measuring initial values for Vb, Vh, Vg, once before recording an entire file. This is not equivalent to measuring “the temperature of each printhead prior to and after

printing each cell in the swath with the temperature sensor" as recited in claim 37. Kojima does not correct the defect in Jones. Accordingly, Jones and Kojima, alone or in combination, fail to teach or suggest the recited features of claim 37.

5 For at least the foregoing reasons, the §103 rejections of claims 27, 37, 44, 51, 57, and 67 should be withdrawn.

Conclusion

10 Claims 26-27, 30-35, 37-38, 41-44, 47-49, 51-52, 55-57, 60-65, 67-68, and 71 are in condition for allowance. Applicant respectfully requests reconsideration and issuance of the subject application. Should any matter in this case remain unresolved, the undersigned attorney respectfully requests a telephone conference with the Examiner to resolve any such outstanding matter.

15

Respectfully Submitted,

Date: 6/21/05

By [Signature]
William J. Breen III
Lee & Hayes, PLLC
Reg. No. 45,313
(509) 324-9256 ext. 249

20